

Factors Improving Outcomes in Workers' Compensation

By Jeff Harris, MD, MPH, MBA

Introduction

Costs for workers' compensation benefits in California have increased sharply in recent years, following periods of decline and stability. California was already one of the most expensive states for total costs per injured worker and for a number of types of testing and treatment in the mid- to late 1990s. For example, a series of multi-state studies revealed that California has the second highest workers' compensation costs among the comparison states (twice the cost of the lower cost states).¹ These data raise several questions:

- What accounts for the higher costs?
- Does more money spent on workers' compensation medical care yield better outcomes for injured workers?

Our inquiries into these data led us to try to identify practices that would improve outcomes at the same or lower costs.

The most expensive groups of diagnoses in workers' compensation in California and most other states are sprains, strains and regional pain of the low back, shoulder, neck and hands and wrists, sprains, strains and internal derangements of the knee, hand and wrist superficial trauma, low back nerve root compression, ankle and foot sprains, strains and regional pain, and hand and wrist nerve compression. There is evidence that nerve compression problems may be considerably over-diagnosed, so that the real top problems may be soft tissue complaints and superficial trauma. Many soft tissue complaints do not have a clear injury associated with them, raising the question of whether these complaints are symptoms, occupational diseases, or frank injuries. This spectrum of disease is very different from the predominance of major trauma seen when the workers' compensation system was introduced in the beginning of the last century.

Evidence suggests that workers' compensation medical care and disability management in California may not be as efficient or effective as they could be. In short, they do not constitute best practices. The studies revealed that for many diagnostic groups, surgery and physical medicine do not improve outcomes. Further, time off work was independent of the use of medical resource and cost variables.

How can these and other outcomes be improved? What are the desired best practices in medical care and disability management? This paper synthesizes a number of data sources to gain insight into the provider, employer, injured worker and legal practices that should lead to the best outcomes for workers.

Methods

This paper draws on research from several groups of studies performed in the last several years.^{2,3,4,5} Methods are more fully described in the source studies.

In these studies, the authors classified several databases from a major insurer, a data consolidator, and the entire state of Texas, into homogenous diagnostic groups, which corresponded to discrete and (in theory) homogeneous recommended medical care and disability management processes. They then compared actual resource use by diagnostic group to resource use levels recommended by evidence-based guidelines.

The authors also compared the characteristics of low- and high-cost cases, to better understand their underlying differences. Having determined that costs and resource use were heavily concentrated in the top quintile of injured workers, the authors separately conducted file reviews and comparison to guidelines of several cohorts of high cost, long duration cases. In a separate project that also provided detail about the clinical appropriateness of care for the high cost group, several of the authors conducted criteria-based reviews of several groups of independent medical examinations of injured workers.

The authors performed Cox proportional hazard regressions to determine whether there was a correlation between outcomes such as time off work, costs, and duration of medical care, and resource use. The authors also surveyed several thousand injured workers in four states about functional and economic outcomes, satisfaction, provider and employer practices, and determined correlations among these factors.

Evidence of Efficiency and Effectiveness of Care and Disability Management in Workers' Compensation

Both direct and indirect methods of analysis have been used to examine the efficiency of workers' compensation medical care. Indirect methods suggest that there may be a problem, and direct methods are used to confirm implications of indirect analyses. Taken as a body of evidence, these studies reinforce each other to create a picture of the efficiency and effectiveness of current workers' compensation medical care and disability management.

Indirect Comparisons

The indirect methods discussed here compare population groups, with the implied assumption that lower cost or use groups have experienced more efficient and effective care. Indirect methods include comparisons of treatment of clinically similar entities among geographically based cohorts, different health care systems, and cohorts with different costs or exposures within populations.

All three methods suggest that there might be opportunities for improvement in the care of workers' compensation claimants in California.

Interstate Variations

Comparison of resource use among the conditions paid for by workers' compensation in 12 states revealed that workers' compensation cases in California are more costly, using more resources and having more lost time than most comparison states. California workers' compensation medical care costs per case were the third most expensive of the 12 states studied for 1996-1998. For that time period, examination of two different cohorts of claims from different insurers revealed that the average cost per case (including medical only cases) was \$1756 and \$1821 respectively. (As a point of comparison, costs were highest in Texas).

Reimbursement levels affect costs. California sustained these high costs despite an Official Medical Fee Schedule that had been frozen since 1976. These costs were almost twice the cost per case of the lowest cost states. High costs might be incurred in providing more effective medical care or they might not.

The duration of medical care in California was the longest among the states, being almost double the duration in some other states.

The duration of medical care was more than twice the duration in the lowest cost state. Long duration of medical care was associated with more treatment. The relationship was not linear, given the lower reimbursement for many services in California.

Average time off work was also the longest among the comparison states. It was disproportionately longer than the duration of medical care. Interestingly, regression analysis (see below) revealed that there was no association between the duration of medical care and the duration of time off work. These results are summarized in Figure 1.

Figure 1
Variance in Costs, Durations (12 states)

Interstate variance	<i>Position</i>	<i>Amount</i>	<i>Variance</i>
Cost	3	\$1800	2x
Duration of medical care	1	21 weeks	> 2x
Time off work	1	29 weeks	> 3x
Managed care DOMC		4 weeks	5 x

Source: Harris, Bengel, Makens, Lee, et. al. *Striking the Balance*. Austin: ROC, 2001

Resource use patterns differ substantially among states. In Texas, for example, there are high rates of surgery compared to other states. In California, there was more than three times the use of modalities, therapeutic exercise, and "other physical medicine" than in the lowest use states. Many more tests were also performed, with California physicians

ordering more plain radiographs, MRIs, and electrophysiologic studies than comparison states. California led the group in the number of epidural steroid injections, CT scan contrast injections, and arthrograms. Chiropractors ordered more than twice the number of tests and physical medicine treatments than allopathic physicians working with physical therapists. California physicians also prescribed many more medications than those in other states. They wrote eight prescriptions per patient, as opposed to 4.5 in Minnesota. Many of these differences are shown in Figure 2.

Figure 2
Variance in Resource Use Among 12 states

Interstate variance	<i>Position</i>	<i>Type</i>	<i>Variance</i>
Physical medicine	1	Modalities, ther. ex, other	> 3 x
Tests	1/2	Xrays/ MRI, NCV/EMG	1.2—3 x
Injections	1	ESI, CT, arthrograms	2 x
Inter-professional resource use	chiropractic v. physical medicine		> 2x

Source: Harris, Bengle, Makens, Lee, et. al. *Striking the Balance*. Austin: ROC, 2001

Intersystem Variations

Comparisons between differently financed treatments of the same cohort of patients in Texas, echoing a similar study in Minnesota, showed much greater cost and use of resources in workers' compensation cases than in similar cases paid for by a group health PPO. Costs were 4.5 times greater. There was much greater use of injections, manipulation, therapeutic exercise, electrodiagnostic testing, and surgery among cases paid for by workers' compensation. Many of these differences are shown in Figure 3.

Figure 3
Variance in Resource Use between Group Health and Workers' Compensation

Intersystem variance	<i>Variance</i>
Cost	4.5 x
Injections	2 x
Manipulation	3.5 x
Therapeutic exercise	> 2 x
Electro testing	3 x

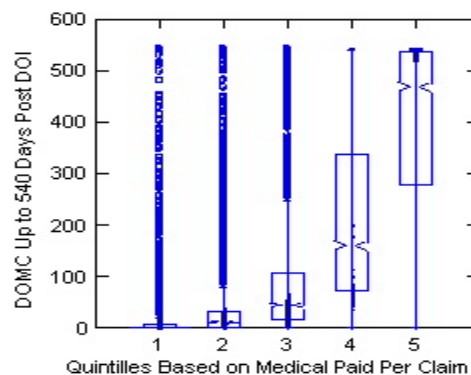
Source: Harris, Bengle, Makens, Lee, et. al. *Striking the Balance*. Austin: ROC, 2001

Within-Cohort Comparisons

About 20% of injured workers account for over 80% of the costs, resource use, and durations of care and time loss in workers' compensation. While this pattern is present in all the states studied, the high cost group is more concentrated and uses a smaller proportion of resources in states other than Texas and California. Multiple diagnoses, diagnoses outside the first named diagnostic group, and diagnoses involving multiple body parts were much more common in the top quintile. There were a much higher mean and median number of providers in the top quintile. Almost all surgeries were in the top quintile, and there was a high use of physical medicine. Both duration of care and time off work are much greater in the top quintile.

Figure 4 demonstrates this phenomenon for the duration of medical care. These findings raise questions about whether the highest quintile patients were more seriously ill than those in lower quintiles, or whether resources were used without producing measurable clinical improvement. Determining the answer requires structured reviews of medical records and comparison to search and guideline recommendations.

Figure 4
Differences in Duration of Medical Care by Quintile



Source: Harris, Bengel, Makens, Lee, et. al. *Striking the Balance*. Austin: ROC, 2001

Cost Distribution and Comparison to Clinical Practice Guidelines

Figures 5 and 6 illustrate extrapolated differences in resource use between lower quintiles and the top quintile and a comparison to the resource use recommended by clinical practice guidelines. The quintile ratios computed for Texas claims were applied to California data. There were many more office visits, tests and treatments among high cost patients. Low cost patients' treatment generally comported with guideline recommendations, but high cost patients' care was far in excess of those guidelines.

Figure 5

Comparison of Office Visits and Testing Between Low and High Cost Patients
Treated by Allopathic Physicians

Service	Lower 80%	Top 20%	Guidelines
Office visits	4	20	4
X-rays	1	8	0
MRI	0	3	0
NCV	0	46	0

Source: Harris, Bengle, Makens, Lee, et. al. *Striking the Balance*. Austin: ROC, 2001

Figure 6

Comparison of Treatment Intensity Between Low and High Cost Patients
Treated by Allopathic Physicians

Source: Harris, Bengle, Makens, Lee, et. al. *Striking the Balance*. Austin: ROC, 2001

Service	Lower 80%	Top 20%	Guidelines
Therapeutic Exercise	18	40	Up to 10
Modalities	15	75	Up to 20
Work Hardening	0	80	Unproven
Epidurals	0	18	0
Laminectomies	0	>1	inappropriate
Fusions	0	0.5	inappropriate

Chiropractors in particular showed these large differences between cohorts (Figure 7). In the case of modalities and manipulation, even the lower quintiles received treatment in excess of guideline recommendations. Similar results have been noted in other studies.^{6 7}

Figure 7

Comparison of Treatment Intensity Between Low and High Cost Patients
Treated by Chiropractic Physicians

Service	Lower 80%	Top 20%	Guidelines
Therapeutic exercise	6	81	Up to 10
Modalities	45	137	Up to 20
Manipulation	17	170	Up to 10
Work hardening	0	156	Unproven effectiveness

Source: Harris, Bengle, Makens, Lee, et. al. *Striking the Balance*. Austin: ROC, 2001

Direct Comparisons Of Data to Benchmarks

Studies of cohort or case data provide the opportunity to directly test the relationships among variables or to determine the medical necessity of various levels of resource use. These are valuable in workers' compensation to examine the assertion that more treatment produces a better result. Direct studies include correlations between resources and outcomes, correlation of survey data with outcomes, and records reviews compared to guidelines and evidence searches to assess diagnostic and causation accuracy, testing and treatment appropriateness, and disability management. The reviewer can determine whether clinical improvement followed use of resources over time.

Correlations Between Treatment and Outcomes

Cox Proportional Hazard regressions revealed a number of important findings. First, neither the cost of lost time nor its duration was significantly related to the cost or duration of medical care. In other words, at least for the large claims database analyzed in these studies, time loss was not related to medical care.

For the ten leading diagnostic groups, surgery was associated with disproportionate cost increases, and increased duration of medical care and time off work. Physical medicine treatment produced a linear increase in cost, as well as increases, rather than decreases, in the duration of medical care and time off work.

Another line of evidence in the same studies supports these data. The researchers regressed claims variables against self-reported health status using ANOVA. Neither surgery nor physical medicine had an effect on physical or mental functioning scores. Physical therapy did not affect time off work, and surgery increased TOW slightly. There was no improvement in any of the top 10 diagnostic groups. With more physicians involved in the case and more diagnoses per case (characteristic of the top quintile claims), both physical and mental functioning scores were worse than those cases with only one or two physicians and a more limited set of diagnoses.

File and IME reviews: Clarifying the Clinical Reasons for Resource Use and Lost Time

Reviews of files of high cost cases reinforced the conclusions of the statistical studies. Such cases tended to be active for quite a long, ranging from 2 two to twenty years in duration. The claimants' function did not improve, despite protracted medical care, typically including use of multiple anti-inflammatory and pain medications, extended physical therapy (often unclear whether active or passive) and/or chiropractic care, or multiple surgical procedures. The majority of surgical procedures did not meet utilization review criteria in retrospect, or were performed for problems that were unlikely to be work-related.

High cost cases involved many providers, many referrals among those providers, and many diagnoses and body parts named as involved in what typically started as a single complaint. Despite the use of these resources, reported functional ability and pain complaints typically remained the same. Many of these cases were litigated.

Many claimants were workers with sedentary or light jobs. There did not seem to be exposure to significant trauma in many cases. There was a high frequency of co-morbidity such as obesity, diabetes, and chronic musculoskeletal pain; workers' compensation payers often assumed care for these co-morbidities. Many patients had risk factors for chronic pain such as emotional, physical or sexual abuse. Some had co-existing psychiatric conditions. A number of them became dependent on pain medication.

The reviewers noted a number of common problems with the analysis and medical care in these cases. Frequently health complaints without clear epidemiologic associations with occupational factors were attributed to work. A commonly seen statement in both medical records and independent medical examinations was that degenerative or multifactorially caused problems were work-related "in the absence of other obvious causative factors." Subsequent examiners tended to accept these assertions. Some providers asserted that complaints that occurred over time were related to the original complaint. Examples include multiple diagnoses in the upper extremities, development of back pain after an extremity complaint, and development of complaints in the opposite extremity. Claims examiners tended to accept these multiple or serial diagnoses as related to the original claim.

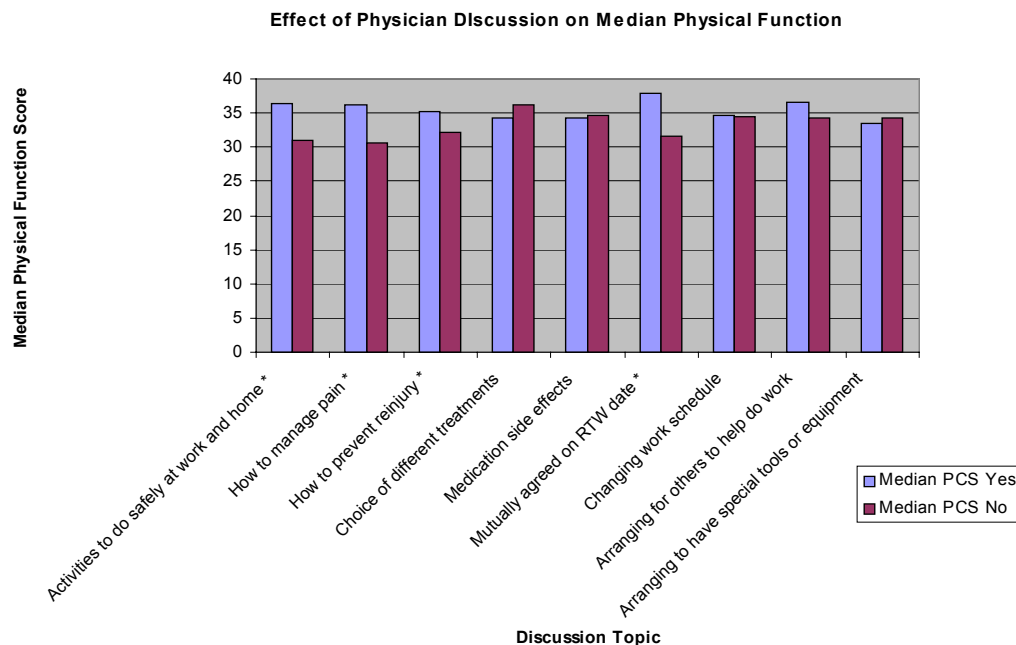
A significant number of diagnoses did not meet criteria, often because of incomplete or absent examinations. The most frequent problem was failure to perform an appropriate neurological examination. As a result, there were a number of diagnoses of nerve root impingement or nerve compression made solely on maneuvers without neurological findings and surgery was proposed. When surgery that did not meet criteria was performed as the result of a judicial action, the results were not encouraging.

There appeared to be a great deal of inappropriate time off work as well. It was not at all clear that many of these workers could not work at all. There were also significant gaps in treatment without return to work. To compound the problem, independent medical examinations suffered from a lack of critical treatment and disability analysis, so that proper direction for the cases was not provided.

Effective Physician Practices

A number of general medicine studies have demonstrated a correlation between doctor-patient communication and improved outcomes. A parallel, stratified survey of workers in four states revealed specific employer and physician practices associated with better mental, physical, financial and time loss outcomes. The survey of several thousand injured workers in four states included questions about physician practices. Correlation of the questionnaire responses with various outcomes revealed that certain physician behaviors were associated with improved physical capacity scores (Figure 8) and less time off work (Figure 9).

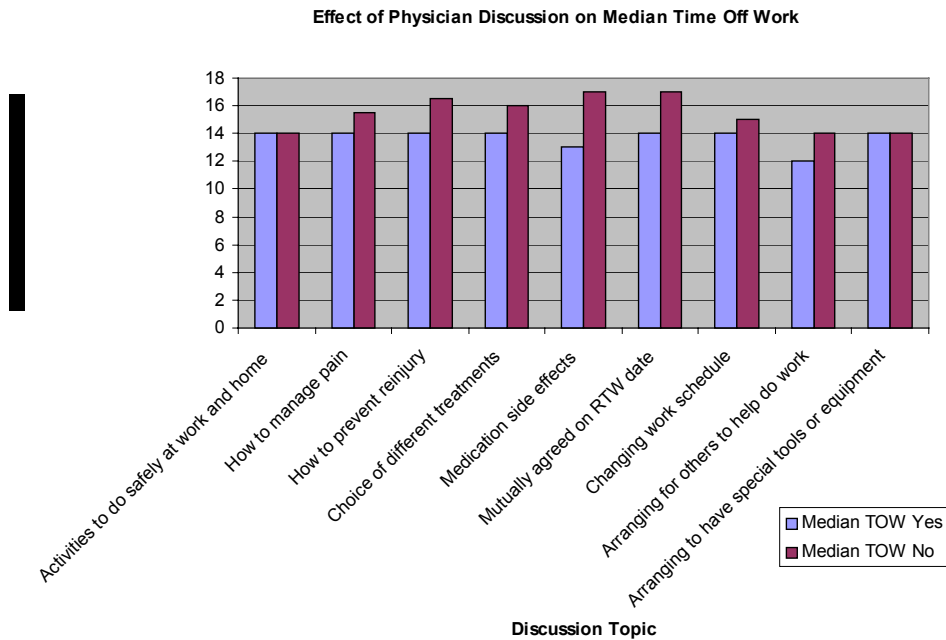
Figure 8



* = significantly associated with higher PCS scores

Physician communications associated with higher physical capacity scores included discussions of activities that could be done safely at work, pain management, prevention of reinjury, and agreement on a mutually acceptable return to work date.

Figure 9



Discussions of pain management, injury prevention, treatment choice, medication side effects, arrangements for help at work, and a mutually agreed on return to work date were associated with less time off work.

Fostering self-management also appeared to be important. An internal locus of control was associated with significantly higher satisfaction scores, mental functioning scores, physical functioning scores, and shorter time off work, although the relationship did not reach statistical significance.

Discussions about a time for return to work appeared to be particularly important. The mean mental capacity score was 51.5 when the return to work date was mutually agreed on and 41.5 when it was not. Injured workers lost 13 weeks of time when the return to work date was mutually agreed on and 18 weeks when they were not.

The file reviews reinforced effective physician practices advocated in evidence-based occupational medicine practice guidelines.^{8, 9} These are generally the inverse of the practices seen in high cost cases. Effective practices start with an accurate diagnosis, and then an accurate causality attribution based on a clear exposure and plausible associations between the exposure and the health problem. A proper causal attribution forms the basis for prevention of more occurrences in others and exacerbation in the index patient.

The cornerstone of effective workers' compensation medical care is an outcome- and time-based treatment plan that is based on evidence of effectiveness and a positive benefit-to-risk ratio. Treatment in such a plan is appropriate in frequency and duration

and contains no duplication of services. Treatment stops when functional improvement stops. Modified duty is instituted as soon as possible.

In addition, there is regular, complete documentation of care and reporting. It serves as a means of communication among the physician, ancillary health providers, case managers, employers and injured workers. There is teamwork and communication with nurse case managers and the employer.

Effective Employer Practices

The survey also provided empirical support for a number of recommended employer practices. Cooperation between the employer and the treating doctor resulted in a median PCS score of 39.2, compared to 32.2 with reported lack of cooperation. The median MCS score with cooperation was 49.9, compared to 38.2 without it. Median time off work was 11 weeks when the employer and the treating physician worked together, vs. 17 weeks.

When the employee reported that his or her employer tried to understand his or her capabilities following injury, the median PCS score was 40.3, compared to 33.2 without such an attempt. The difference in MCS scores was even greater, at 51.1 v. 38.6. Employees whose employers tried to understand their capabilities returned to work in 12 weeks, compared to 16 weeks when this did not occur.

Provision of modified duty improved PCS scores by a small amount, with median scores of 36.6 compared to 33.3. Effects on MCS scores and time off work were not significant.

Mutual choice of physician resulted in median MCS scores of 51.7, v. 44.7 weeks when the employer alone chose the physician. Time off work was 5 weeks with a mutual choice of doctor, as compared with 15 weeks otherwise.

Comparison of high cost states to other states also revealed that fewer employers in high cost states were reported to treat employees with respect prior to their injury. More employees reported trouble with their supervisors prior to injury, and more reported that they were fired post-injury. More employees in high-cost states reported that their employer did not seem concerned about their safety.

Economic and Employment Impact

The impact of work-related injuries on employment and the worker's financial well-being was at times significant. Of those surveyed, about a third of workers were not working at 540 days post-injury. Half of those not working stated that they were unable to work because of their injury.

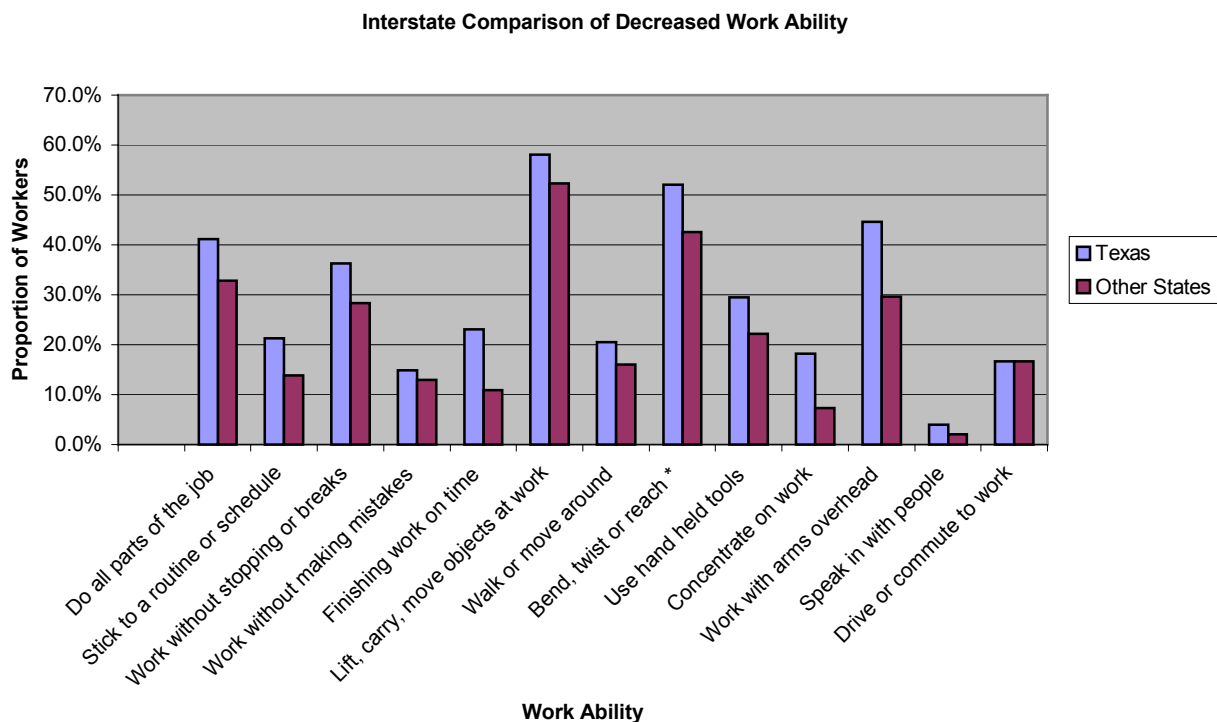
About a quarter of workers had to use savings after their injury, about the same number had problems with bills, and slightly less borrowed money. About 10% went into credit

card debt. Smaller numbers of workers had their spouse return to work, lost health insurance coverage, used food stamps, or had their cars repossessed or sold at six months after injury. These figures declined after six months, suggesting some adaptation had been made.

Incomplete Functional Recovery

Substantial numbers of injured workers reported less ability to perform a number of tasks after their injury. These results are shown in Figure 10.

Figure 10



Summary

Effective care and care management for work-related health complaints is built on documented best practices. Presently, there is substantial inconsistency among cases and providers in care provided for similar health problems. This inconsistency creates more than the usual confusion when there are multiple providers involved, typical of high cost cases.

One area of notable inconsistency in workers' compensation cases is diagnosis. Diagnoses should meet all specific criteria for that diagnosis, particularly when surgery is entertained as an option. Non-anatomic pain, or pain and a positive maneuver of low sensitivity or specificity, are not sufficient for diagnoses involving nerve compression. It

is especially important to avoid diagnostic expansion or “creep,” in which the worker’s complaints of regional pain are deconstructed into multiple diagnoses of disorders of every joint or muscle group in the affected area. This is not only biologically unlikely, especially with sedentary work, but also labels the worker as seriously ill or injured, and invites multiple surgical interventions that are often unsuccessful in resolving pain complaints.

Treating physicians are most effective when they understand the worker’s health complaint in context. The physician should elicit information about all co-morbidities, the worker’s job demands and work situation, and risks for delayed functional recovery (a detailed summary of documented risks is available in the ACOEM *Occupational Medicine Practice Guidelines*).

The physical examination should be focused but complete for the presenting complaint. Many examinations included detailed range of motion findings, which were seldom useful for common problems, and omitted the relevant neurological examination. Neurological examinations that were present were often incompletely documented or misinterpreted. Electrophysiologic tests were also frequently misinterpreted. (These areas were the most frequently deficient in training done in the dissemination of the ACOEM *Guidelines* as well.)

Another area in need of improvement was the analysis of work relatedness. Physicians should be certain that a mechanism known to cause the problem was involved. Simply being at work when a problem was noticed is not a scientifically acceptable relationship between work and the health problem at issue. This reasoning results in payment for virtually any health problem as work-related, for the life of the claimant, and renders preventive efforts ineffective, since no valid association was present. Clinicians should also separate the effects of aging, obesity, other co-morbidities, and coping skills and psychosocial issues from the work-related health problem to allow focus on each issue for more effective treatment and management.

Physician/patient discussion and education are cornerstones of effective treatment. Outcomes were improved when treating physicians discussed pain management, safe work, return to work, and other factors with injured workers. A discussion of the evidence for causation is a necessary part of a discussion of safe work and prevention of future problems. It appears that these discussions work best when framed as a partnership, with agreement on key issues such as a date for return to work and what activities the worker can safely do.

Treatment should be consistent with evidence of effectiveness, and time- and recovery-based. Improvement should be quantitatively documented, and treatment should be stopped when improvement stops. This should be intuitively obvious, but it is uncommon in high-cost cases. Legally determined “medical science” that is inconsistent with high-grade scientific evidence, observed in a number of cases, should be avoided for the ultimate benefit of the injured worker.

It is important to note in treatment planning that many common musculoskeletal complaints do best with maintenance of activity. Release to appropriate modified duty is important in this context, and to maintain social support and involvement in the workplace. Coordination with the employer is critical for planning and for framing of safe modified work.

Employer practices that were associated with better outcomes included offers of appropriate modified duty, cooperation with the treating physician, and an attempt to understand the returning worker's capabilities. Understanding the reasons for the health complaint is important for prevention of exacerbation and new cases. Associated work conditions should be mitigated to optimize health and productivity.

Workers must have an active role in prevention and recovery as well. Regular aerobic exercise and stretching are important to prevent regional muscle pain, as are proper workstation adjustment and posture of the worker. This is particularly important in workers with comorbidities such as obesity and fibromyalgia. After a health complaint is noted, graded return to activity or maintaining activity is important to facilitate functional recovery in many instances of neck, shoulder, knee, ankle and back problems. Understanding and actively managing pain and function are key as well. Workers with an internal locus of control did better on most outcome measures than those with an external (physician) locus.

At present, insurance adjusters are the *de facto* control point for workers' compensation medical and disability management. They are not trained or experienced in medical decision-making or disability management, yet their decisions about payment provide direction for cases on a daily basis. The results are evident in the data presented above.

Attorneys would best serve their clients by seeking evidence-based medical care, and advocating adherence to agreed-on, time-based treatment and disability management plans. Testing, physical medicine and surgery that are not clearly supported by clinical guidelines almost always result in worse outcomes.

The question then arises, how could we assure the consistent delivery or management of high-quality care? The presence and nature of the high cost cohort suggests that there is significant opportunity for improvement. Medical care should clearly be managed according to best practices. This requires organized medical delivery systems with timely, accurate and longitudinal medical information to support appropriate decision-making and consistent diagnosis, treatment, and disability management. Uncoordinated care without a quality management system has produced the less than optimal results presented here.

Jeffrey S. Harris MD, MPH, MBA
Mill Valley, CA 94941

References

- ¹ Harris JS, Benge AL III, Makens PK, Lee A et al. Striking the Balance: An Analysis of the Cost and Quality of Medical Care in the Texas Workers' Compensation System. Austin: Texas Research and Oversight Council on Workers Compensation, 2001.
- ² Harris JS, Benge AL III, Makens PK, Lee A et al. Striking the Balance: An Analysis of the Cost and Quality of Medical Care in the Texas Workers' Compensation System. Austin: Texas Research and Oversight Council on Workers Compensation, 2001.
- ³ Harris JS, Benge AL III, Makens PK, Brigham CR, Christian JH, Siktberg D et al. Improving The Quality of Independent Medical Examinations. Olympia, WA: State of Washington Department of Labor and Industries, 2002.
- ⁴ File reviews for diagnostic accuracy, procedure appropriateness and disability management at several major workers' compensation insurers
- ⁵ Harris JS, Benge AL III, Makens PK et al. Returning to Work: An Examination of Existing Disability Duration Guidelines and Their Application to the Texas Workers' Compensation System. Austin: Texas Research and Oversight Council on Workers Compensation, 2001.
- ⁶ Victor RA, Wang D. Patterns and Costs of Physical Medicine: Comparison of Chiropractic and Physician-Directed Care. Cambridge, MA: Workers' Compensation Research Institute, 2002.
- ⁷ CWCI. Changes in Utilization of Chiropractic Care in California Workers' Compensation. ICIS Says Research Reports. Oakland, CA: California Workers' Compensation Institute, 3/21/03.
- ⁸ Harris JS, Blais BB, Brigham CR, Kuhn A et. al., Occupational Medicine Practice Guidelines: Evaluation and Management of Common Health Problems and Functional Recovery in Workers, Boston: OEM Health Information Press, 1997.
- ⁹ Glass LS, Harris JS, Blais BB, Genovese E, Mueller KL et. al., Occupational Medicine Practice Guidelines: Evaluation and Management of Common Health Problems and Functional Recovery in Workers, Boston: OEM Health Information Press, Edition 2, in press, 2004.